

U.S. EPA Landfill Methane Outreach Program Landfill Gas Analysis Report for Enoree Landfill

A landfill gas generation curve was developed for the Enoree Landfill in Greer, South Carolina, using several parameters specific to the landfill and defaults from AP-42¹. These data were entered into the EPA LandGEM² software to estimate landfill gas production, beginning with the year after the landfill opened. The values of these model input parameters are provided in Table 1. Landfill-specific data were obtained from an email³, which is included in Appendix A. These data include the year the landfill opened, the current amount of waste-in-place, the current annual waste acceptance rate, the expected landfill closure year, and remaining capacity. The total design capacity of the landfill was calculated using the data/assumptions shown in Appendix A. The current waste-in-place amount was used to calculate an average annual waste acceptance rate from the year the landfill opened until 2001. The average annual waste acceptance rate from 2001 until the landfill closes was calculated by the LandGEM software using the waste capacity and closure year of the landfill.

Collection of the LFG at its peak flowrate of 360 mmcf in 2007 would be equivalent to any of the following environmental benefits:

Removing 16,000 cars from the road
Planting 22,000 acres of forest
Offsetting the use of 360 railroad cars of coal
Preventing the use of 170,000 barrels of oil

Also necessary for the model to run are the following parameters: L_o (methane generation potential), k (methane generation rate constant), and the percent volume of methane and carbon dioxide in the landfill gas. Defaults from AP-42 were used for L_o and k , and LandGEM software defaults were used for the percent methane and carbon dioxide. The AP-42 default value for k for non-arid areas was used because several sources indicated an average annual precipitation of greater than 25 inches for the area surrounding the landfill.

Table 1: Model Input Parameters for the Enoree Landfill

Model Parameter	Value	Units
Year Landfill Opened	1994	-----
Expected Landfill Closure Year	2007	-----
Waste Capacity	2,071,843	tons
Waste-In-Place	1,298,248	tons
1994-2001 Annual Waste Acceptance Rate	157,644	tons/yr
2002-2007 Annual Acceptance Rate	161,388	tons/yr
Methane Generation Constant (k)	.04	yr ⁻¹
Methane Generation Potential (L ₀)	3,203	ft ³ /ton
Percent Methane in Landfill Gas	50	%
Percent Carbon Dioxide in Landfill Gas	50	%

The estimated waste-in-place in tons and landfill gas generation in million cubic feet per year (mmcf/yr) for a 45-year period are shown in Table 2. Also provided is the estimated amount of landfill gas recovered over time, which was calculated using the assumption of an 85% collection efficiency rate. The graph was created using the landfill gas production and recovery data in Table 2. The curves demonstrate the landfill gas generation and recovery rates over time.

These projections have been prepared specifically for the Enoree Landfill on behalf of the U.S. EPA Landfill Methane Outreach Program (LMOP), and are based on engineering judgement and represent the standard of care that would be exercised by a professional reasonably experienced in the field of landfill gas projections. ERG, EMCON, and LMOP do not guarantee the quantity of available landfill gas, and no other warranty is expressed or implied. No other party is intended as a beneficiary of this work product, its content, or information embedded therein. Third parties use this information at their own risk. ERG, EMCON, and LMOP assume no responsibility for the accuracy of information obtained from, compiled, or provided by other parties.

References

1. Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources. Chapter 2: Solid Waste Disposal. Section 2.4.4.1. U.S. EPA. November 1998. <http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s04.pdf>
2. Landfill Gas Emissions Model, version 2.01. U.S. EPA. January 6, 1999. <http://www.epa.gov/ttn/catc/products.html>
3. Email correspondence from Sonny DuBose, South Carolina Office of Energy, to Shelley Cohen, LMOP. October 31, 2001. Shown in Appendix A.

Appendix A

E-mail Containing Data for the Enoree Landfill

Sonny Dubose <SDubose@ogs.state.sc.us>

10/31/01 08:44 AM

To: Shelley Cohen/DC/USEPA/US@EPA, jkfranklin@theitgroup.com

cc:

Subject: Enoree Landfill Info:

Landfill	Year Opened	Waste in Place	Yearly Acceptance	Remaining Capacity
Enoree	9/29/94	1,298,248 tons	243,750 tons	1,898,692 Cubic Yards

Year of Closure: 2007

Thanks!!

Sonny